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IS 11654-3-405 (1989): Flexible insulating sleeving, Part 3: Specifications for individual types of sleeveings, Section 405: Glass textile sleeving coated acrylic based coating lower [ETD 2: Solid Electrical Insulating Materials and Insulation Systems]

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Indian Standard

**SPECIFICATION FOR
FLEXIBLE INSULATING SLEEVING**

PART 3 SPECIFICATIONS FOR INDIVIDUAL TYPES OF SLEEVINGS

**Section 405 Glass Textile Sleeving with Acrylic Based
Coating — Lower Breakdown Strength**

भारतीय मानक

नम्य विद्युतरोधन स्लीविंगों की विशिष्टि

भाग 3 अलग-अलग स्लीविंग

**अनुभाग 405 निम्न भंजन सामर्थ्य वाली एकाइलिक आधारित लेपनयुक्त काँच वस्त्रादि
की स्लीविंग**

UDC 621.315.614.72-462

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**BUREAU OF INDIAN STANDARDS
MANAK BHAVAN, 9 BAHADUR SHAH ZAFAR MARG
NEW DELHI 110002**

FOREWORD

This Indian Standard (Part 3/Sec 405) was adopted by the Bureau of Indian Standards on 20 September 1989, after the draft finalized by the Solid Electrical Insulating Materials Sectional Committee had been approved by the Electrotechnical Division Council.

This standard deals with flexible insulating sleeveings. It consists of the following three parts:

Part 1 Definitions and general requirements,

Part 2 Methods of tests, and

Part 3 Specifications for individual types of sleeveings.

This standard (Part 3/Sec 405) covers the requirements for glass textile sleeving coated with acrylic resin of lower breakdown strength.

This standard should be read in conjunction with IS 11654 (Part 1) : 1986 and IS 11654 (Part 2) : 1986.

In the preparation of this standard, assistance has been derived from IEC Doc : 15C (Central Office) 200, Sheet 405 Glass textile sleeving coated with acrylic based coating : Lower breakdown strength, issued by the International Electrotechnical Commission (IEC).

For the purpose of deciding whether a particular requirement of this standard is complied with, the final value, observed or calculated, expressing the result of a test or analysis, shall be rounded off in accordance with IS 2 : 1960 'Rules for rounding off numerical values (*revised*)'. The number of significant places retained in the rounded off value should be the same as that of the specified value in this standard.

Indian Standard

SPECIFICATION FOR FLEXIBLE INSULATING SLEEVING

PART 3 SPECIFICATIONS FOR INDIVIDUAL TYPES OF SLEEVINGS

Section 405 Glass Textile Sleeving with Acrylic Based Coating — Lower Breakdown Strength

1 SCOPE

1.1 This standard covers the requirements for 'E' type glass sleeving using either braided or knitted construction with a continuous acrylic based coating of lower breakdown strength, temperature index 155.

2 REFERENCES

2.1 The Indian Standards listed in Annex A are necessary adjuncts to this standard.

3 DESIGNATION

3.1 Sleeving covered in this standard shall be identified as given in 3.1 of IS 11654 (Part 1) : 1986. For example, IS 11654-3-405 — Nominal bore size in mm — with suffix ('B' indicates bilateral and 'U' indicates unilateral tolerance) indicating type of tolerance — colour code (see Note 2).

NOTES

1 In those cases where the designation is required to differentiate between sleeving which is braided and sleeving which is knitted the designation may be worded with suffix as braided or knitted.

2 Colour Code shall be as indicated in 3.2 of IS 11659 (Part 1) : 1986.

For example:

IS 11654-3-405 — Nominal bore size in mm — with suffix indicating type of tolerance — colour — braided or knitted.

4 COLOUR AND BORE SIZES

4.1 The sleeving is normally available in bore sizes 0.3 mm to 23 mm and in the following colours:

Black, white, red, yellow, blue, brown, green, green/yellow and natural.

5 REQUIREMENTS

5.1 In addition to the general requirements given in IS 11654 (Part 1) : 1986, requirements specified in this standard shall also be applicable.

5.2 Dimensions

The sleeving shall comply with the dimensional requirements given in Table 1.

5.3 Bending after Heating

When tested in accordance with 13 of IS 11654 (Part 2) : 1986, there shall be no cracking or

Table 1 Dimensional Requirements
(Clause 5.2)

Nominal Bore (mm)	Tolerance on Bore Dia (mm)		Wall Thickness (mm)	
	Bilateral (\pm)	Unilateral (\pm)	Min	Max
(1)	(2)	(3)	(4)	(5)
0.3	0.10	0.20	0.15	0.50
0.5	0.10	0.20	0.15	0.50
0.8	0.10	0.20	0.15	0.50
1.0	0.15	0.30	0.15	0.75
1.5	0.15	0.30	0.15	0.75
2.0	0.20	0.40	0.15	0.75
2.5	0.20	0.40	0.15	0.75
3.0	0.25	0.50	0.15	0.75
4.0	0.25	0.50	0.20	0.75
5.0	0.25	0.50	0.20	0.75
6.0	0.25	0.50	0.20	0.75
8.0	0.25	1.00	0.20	0.75
10.0	0.50	1.00	0.40	0.75
12.0	0.50	1.00	0.40	0.75
16.0	0.50	1.00	0.40	0.75
20.0	0.50	1.00	0.40	0.75
25.0	0.50	1.00	0.40	0.75

NOTE — Only positive tolerance may be used subject to agreement between the supplier and the purchaser but the criterion of nominal bore diameter shall be adopted.

detachment of coating and the original colour shall be clearly recognizable after testing at temperature $180 \pm 3^\circ\text{C}$ and mandrel diameters given in Table 2.

5.4 Bending at Low Temperature

When tested in accordance with 14 of IS 11654 (Part 2) : 1986, there shall be no cracking or detachment of coating visible after bending around mandrels of diameters given in Table 2, while at temperature not above -15°C .

5.5 Resistance to Soldering Heat

When tested in accordance with 7 of IS 11654 (Part 2) : 1986, the sleeving shall not show sign of splitting.

NOTE — This test is applicable for sleeving having nominal bore dia up to and including 5 mm.

5.6 Hydrolysis of Coating

When tested in accordance with 17 of IS 11654 (Part 2) : 1986, there shall be no running off the coating, adherence between sleeving and paper, between the pieces of sleeving or any sign of discolouration of the paper.

Table 2 Mandrel Diameters for Bending Tests
(*Clauses 5.3 and 5.4*)

Nominal Bore, Dia mm	Mandrel Diameters mm	
	After Heating	At Low Temperature
0.5	3	3
0.8	4	4
1.0	5	5
1.5	6	6
2.0	8	8
2.5	10	10
3.0	12	12
4.0	15	15
5.0	18	18
6.0	21	21
8.0	27	27
10.0	33	6
12.0	40	6
16.0	6	6
20.0	6	6
25.0	6	6

5.7 Thermal Endurance

When tested in accordance with IS 8504 (Part 1) : 1977, TI at 20 000 hours shall be 155 minimum.

5.8 Flammability

When tested in accordance with IS 11654 (Part 2) : 1986, the sleeving shall meet requirement of 60 seconds (maximum). In addition, the indicating flag on test shall not be burned nor shall flaming or glowing particles ignite the cotton.

5.9 Insulation Resistance

When tested in accordance with 22.4.2 of IS 11654 (Part 2) : 1986, the insulation resistance shall be $10^2 M \Omega$ (minimum).

5.10 Breakdown Voltage

5.10.1 Breakdown voltage shall be determined by any of shot bath test given in 21.2 and straight

mandrel test 25 mm electrode given in 21.2 of IS 11654 (Part 2) : 1986.

5.10.2 The rate of voltage application shall be 500 V/seconds or such that the required breakdown value is reached between 10 and 20 seconds.

5.10.3 The requirements of breakdown voltage at room temperature, elevated temperature and damp heat when measured in accordance with 21.7 of IS 11654 (Part 2) : 1986, shall be as given in Table 3.

Table 3 Requirements for Breakdown Voltage

	Shot Bath Test Using Straight Mandrel 250 mm Electrode		Straight Mandrel with 25 mm Electrode	
	Central Value (kV)	Lowest Individ- ual Value (kV)	Central Value (kV)	Lowest Individ- ual Value (kV)
Breakdown volt- age kV (<i>Min</i>)	1.5	1.0	2.5	1.5
At Room Tem- perature				

NOTE — The shot bath test shall not be used for sleeving with nominal bore diameter above 300 mm.

6 PACKAGING

6.1 Provisions of 9.1 of IS 11654 (Part 1) : 1986 shall apply.

7 MARKING

7.1 In addition to the details given in 10 of IS 11654 (Part 1) : 1986, the following information shall be labelled:

Construction of the sleeving — braided or knitted.

ANNEX A

(*Clause 2.1*)

LIST OF REFERRED INDIAN STANDARDS

IS No.	Title	IS No.	Title
IS 8504 (Part 1) : 1977	Guide for determination of thermal endurance properties of electrical insulating materials: Part 1 Temperature indices and thermal endurance properties	IS 11654 (Part 1) : 1986	Specification for flexible insulating sleeving: Part 1 Definitions and general requirements
		IS 11654 (Part 2) : 1986	Specification for flexible insulating sleeving: Part 2 Methods of tests

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Doc : No. ETDC 63 (3111)

Amendments Issued Since Publication

Amend No.	Date of Issue	Text Affected

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